

LISTING OF THE CLAIMS

1. (Previously presented) A method of controlling an exhaust filter regeneration regime comprising:

injecting fuel into an exhaust stream and thereby increasing an exhaust stream temperature, said increasing exhaust stream temperature being in conjunction with a catalytic treatment element;

metering fuel injection dependent upon the exhaust stream temperature;

pre-heating fuel to be injected with vehicle waste heat; and

recording a regeneration regime history and modifying the regeneration regime based on the recorded history.

2. (Previously presented) A method as claimed in claim 1 in which the fuel injecting is metered by controlling one of fuel injection rate, fuel injection pulse duration, amount of fuel injected, fuel injection pressure variation, and injected fuel type variation.

3. (Previously presented) A method as claimed in claim 1 in which the exhaust stream temperature comprises the temperature of the exhaust stream at an outlet of the catalytic treatment element.

4. (Previously presented) A method as claimed in claim 3 in which fuel injection is further metered dependent upon the temperature of exhaust gas exiting an engine and the temperature at an inlet of the catalytic treatment element.

5. (Previously presented) A method as claimed in 1 comprising initiating fuel injection into the exhaust stream when a filter load exceeds an initiation value.

6. (Previously presented) A method as claimed in claim 1 in which fuel injection is terminated upon any of: a filter load reducing to a predetermined determination threshold, a catalytic treatment element temperature reducing below or exceeding a termination threshold or a regeneration regime period exceeding a time threshold.

7. (Canceled)

8. (Canceled)

9. (Previously presented) A method as claimed in claim 1 in which fuel is mixed with compressed air in an injection head prior to injection into an exhaust stream.

10. (Previously presented) A method as claimed in claim 9 in which a supply of fuel to the injection head is terminated a predetermined time prior to a termination of a compressed air supply.

11. (Previously presented) A method of triggering an exhaust filter regeneration regime comprising obtaining a value of filter load as function of a filter pressure and an exhaust mass flow and triggering a regeneration regime when the filter load exceeds a predetermined value;

initiating fuel injection into an exhaust stream upon triggering the exhaust filter regeneration regime;

pre-heating fuel to be injected with vehicle waste heat; and

recording a regeneration regime history and modifying the regeneration regime based on the recorded history.

12. (Canceled)

13. (Previously presented) A method of triggering an exhaust filter regeneration regime comprising:

monitoring filter pressure peak values;

identifying when a filter load exceeds a predetermined value from the monitored filter pressure peak values and triggering a regeneration regime;

initiating fuel injection into an exhaust stream upon triggering the exhaust filter regeneration regime;

pre-heating fuel to be injected with vehicle waste heat; and

recording a regeneration regime history and modifying the regeneration regime based on the recorded history.

14. (Previously presented) A method of triggering an exhaust filter regeneration regime in which fuel is injected into an exhaust stream to increase exhaust stream temperature in conjunction with a catalytic treatment element comprising:

obtaining a value of catalytic treatment element temperature;

triggering the regeneration regime when the obtained temperature exceeds a predetermined value;

pre-heating fuel to be injected with vehicle waste heat; and

recording a regeneration regime history and modifying the regeneration regime based on the recorded history.

15. (Previously presented) A method as claimed in claim 14 further comprising obtaining a value of a filter load as a function of a filter pressure and an exhaust mass flow and triggering the regeneration regime when the filter load exceeds a predetermined value.

16. (Previously presented) A method of controlling an exhaust filter regeneration regime comprising:

- implementing an exhaust stream temperature control strategy;
- monitoring variation in exhaust stream temperature and at least one control parameter;
- obtaining a correlation between variation in exhaust stream temperature and the control parameter and adjusting the temperature control strategy based on the correlation obtained;
- pre-heating fuel to be injected into the exhaust stream with vehicle waste heat; and
- recording a regeneration regime history and modifying the regeneration regime based on the recorded history.

17. (Previously presented) An exhaust filter regeneration apparatus comprising:

- a fuel injector arranged to be mounted in an exhaust stream conduit;
- a controller for controlling the fuel injector, said fuel injector and said controller being configured to implement an exhaust filter regeneration regime comprising injecting fuel into an exhaust stream and thereby increasing an exhaust stream temperature, said increasing exhaust stream temperature being in conjunction with a catalytic treatment element; and a metering of fuel injection dependent upon the exhaust stream temperature;

wherein the apparatus is further arranged to pre-heat fuel to be injected with vehicle waste heat, record a regeneration regime history, and modify the regeneration regime based on the recorded history.

18. (Previously presented) An exhaust filter regeneration apparatus comprising:

an exhaust stream conduit and a fuel injector mounted therein and arranged to inject fuel in an exhaust stream direction and pre-heat fuel to be injected with vehicle waste heat; and

wherein the apparatus is further arranged to record a regeneration regime history and modify the regeneration regime based on the recorded history.

19. (Previously presented) An exhaust filter regeneration apparatus as claimed in claim 18 in which the fuel injector includes a fuel input channel and an air input channel, each said channel having an output end, whereby the output ends of the air and fuel channels are provided adjacent one another at a fuel injection output.

20. (Original) An exhaust filter regeneration apparatus as claimed in claim 19 in which the fuel input channel is connected to a fuel pump and the air input channel is connected to a compressor.

21. (Original) An exhaust filter regeneration apparatus as claimed in claim 20 in which said fuel pump is a peristaltic pump.

22. (Original) An exhaust filter regeneration apparatus as claimed in claim 20 whereby said compressor is arranged to operate in the pressure range of 2 to 200 bar.

23. (Previously presented) An exhaust filter regeneration apparatus as claimed in claim 17 having an electrical heater located upstream of an exhaust gas input face of the catalytic treatment element relative to an exhaust steam flow.

24. (Original) An exhaust filter regeneration apparatus as claimed in claim 23 where said electric heater is formed of a catalytic treatment element.

25. (Previously presented) An exhaust filter regeneration apparatus as claimed in claim 17 in which the fuel injector draws fuel directly from a vehicle fuel tank or fuel line.

26. (Previously presented) An exhaust filter regeneration apparatus as claimed in claim 17 further comprising an exhaust filter component and a sensor extending radially therein.

27. (Previously presented) An exhaust filter regeneration apparatus as claimed in claim 17 further comprising a fuel conduit configured to provide fuel to the fuel injector in which the fuel conduit is preheated by waste heat.

28. (Previously presented) An engine including an apparatus as claimed in claim 17.

29. (Previously presented) A computer readable medium storing a set of instructions to operate a computer arranged to implement an exhaust filter regeneration regime comprising:

injecting fuel into an exhaust stream and thereby increasing an exhaust stream temperature, said increasing exhaust stream temperature being in conjunction with a catalytic treatment element;

metering fuel injection dependent upon the exhaust stream temperature;

pre-heating fuel to be injected with vehicle waste heat; and

recording a regeneration regime history and modifying the regeneration regime based on the recorded history.

30. (Previously presented) A computer arranged to operate under the instructions of the computer readable medium of claim 29.

31. (Previously presented) An engine control unit configured to implement an exhaust filter regeneration regime comprising:

injecting fuel into an exhaust stream and thereby increasing an exhaust stream temperature, said increasing exhaust stream temperature being in conjunction with a catalytic treatment element;

metering fuel injection dependent upon the exhaust stream temperature;

pre-heating fuel to be injected with vehicle waste heat; and

recording a regeneration regime history and modifying the regeneration regime based on the recorded history.

32. (Previously presented) A computer readable medium storing a set of instructions to operate a computer arranged to implement an exhaust filter regeneration regime comprising:

injecting fuel into an exhaust stream and thereby increasing an exhaust stream temperature, said increasing exhaust stream temperature being in conjunction with a catalytic treatment element;

metering fuel injection dependent upon the exhaust stream temperature;

pre-heating fuel to be injected with vehicle waste heat; and

recording a regeneration regime history and modifying the regeneration regime based on the recorded history.

33. (Previously presented) A method of controlling exhaust, comprising:

increasing an exhaust stream temperature;

controlling said increasing an exhaust stream temperature in conjunction with a catalytic treatment element;

metering fuel injection dependent upon said exhaust stream temperature;

pre-heating fuel to be injected with vehicle waste heat;

recording a regeneration regime history and modifying the regeneration regime based on the recorded history.

34. (Previously presented) An apparatus for controlling exhaust, comprising:

means for increasing an exhaust stream temperature;

means for controlling said increasing an exhaust stream temperature in conjunction with a catalytic treatment element;

means for metering fuel injection dependent upon said exhaust stream temperature;

means for pre-heating fuel to be injected with vehicle waste heat; and

means for recording a regeneration regime history and modifying the regeneration regime based on the recorded history.